

Action #6: Protect and restore priority estuarine & nearshore areas

Estuaries and the nearshore provide shelter from predators and food for salmonid juveniles as their bodies adapt to saltwater, as well as migration corridors to offshore areas. Adults also seek refuge from predators in estuaries as they prepare to re-enter freshwater. Computer models suggest that these areas are vital to chinook recovery, especially for the North Fork stock. In particular, shallow, low-velocity areas with fine-grained substrates are crucial, such as blind channels in the Nooksack delta and "pocket" estuaries—small lagoons and embayments fed by small streams or freshwater seeps.

Because protection and restoration efforts may be quite expensive, there are studies underway to assess the quality of WRIA 1 estuarine/nearshore areas, and how and when salmonids use them. Combined with work by the Bellingham Bay Demonstration Pilot Project, completing these assessments, analyzing their results, and planning and prioritizing needed actions will determine the most critical places to restore.

While current assessments are partially funded, future analysis and planning work is not. In addition, given the value of waterfront property, the cost of restoration projects will likely run into the millions of dollars.

Action #7: Restore and reconnect isolated habitats in lowland and independent tributaries

Although habitats in the forks, their tributaries, and the mainstem Nooksack River are considered the highest priority for protection and restoration, projects in the Nooksack's lowland tributaries would also

RESTORE LOWLANDS: This reach of Tenmile Creek flows through a rural area where natural riparian vegetation has been replaced with pastures and lawns. Lack of vegetation has reduced the available shade to almost nothing, causing an increase in water temperature. On the left, replanting work is underway.



RESTORE AND PROTECT ESTUARIES/NEARSHORE: Squalicum Creek flows into Bellingham Bay at a highly developed point.

benefit chinook. Factors that limit fish populations in these streams include barriers to fish passage, lack of habitat complexity such as large woody debris and high quality pools, impaired riparian functions, and water quantity and quality. These issues can be remedied in part by voluntary efforts such as removal of barriers to fish passage, improvement of riparian conditions, stormwater management, and implementation of farm plans.

Action #8: Establish a South Fork gene bank and supplementation program

Improving stream habitat conditions is critical to the recovery of South Fork chinook, but it will be a gradual and long-term process. As an interim measure to preserve the unique genetic characteristics of this stock, a South Fork gene bank and supplementation program will be established at Skookum Hatchery.

This program will have two elements:

Develop and implement a native South Fork chinook brood stock program that increases the numbers of South Fork early chinook spawners in the South Fork while minimizing the effects of hatchery intervention on the stock's genetic character.

Reduce North Fork early and late hatchery chinook strays into the South Fork to reduce risks to the South Fork chinook population.

The gene bank and supplementation program will take into account the genetic benefits and risks of taking South Fork chinook into the hatchery on the wild population, as well as lessons learned from a previous attempt at a South Fork program.

For the complete executive summary, contact:
Whatcom County Public Works
(360) 676-6876
<http://whatcomsalmon.wsu.edu>



November 2005



FACT SHEET

THE SALMON RECOVERY PLAN

Planning: The first step towards recovery

Local and tribal governments and other organizations in WRIA 1 (the state's designation for the Nooksack basin and smaller adjacent watersheds) are stepping up efforts to protect and enhance fish species.

Because time and resources are limited, there needs to be a strategy to prioritize the many different actions that could be taken to recover salmon.

In June 2005, the WRIA 1 Salmonid Recovery Plan was released. It outlines a local strategy of projects, programs, and timelines to recover salmonid populations, with a particular focus on chinook salmon, which are listed as threatened under the federal Endangered Species Act.



Community support and involvement are essential to recovering salmon.

The WRIA 1 Salmonid Recovery Plan includes a comprehensive look at the scientific data collected on salmonids and their habitat over the last several decades, explains the factors inhibiting salmonid populations, and describes strategies and actions needed to recover salmonids to self-sustaining numbers.

Central to the plan are eight actions to be taken in the next ten years that will jump-start early chinook recovery. Because harvest and hatchery management fall under the purview of the tribes and the Washington Department of Fish and Wildlife, many of the new actions proposed in the recovery plan focus on habitat, which is under the control of landowners and city and county governments.

Achieving the vision

The local vision of salmon recovery is to return self-sustaining salmonid runs to harvestable levels through the restoration of healthy rivers, marine shorelines, and natural processes, careful use of hatcheries, and responsible harvest, with the active participation and support of local landowners, businesses, and the larger community.

Achieving this vision will require a range of voluntary actions that will accommodate community needs and interests. Regulatory actions will also be required to ensure "no net loss" of properly functioning conditions in salmonid habitats. In addition, public involvement and education will be necessary, both to help policymakers understand community needs and balance competing interests, and to develop creative solutions that result in actions that benefit fish and people.

Setting the recovery goals

The long-term recovery goal is healthy, self-sustaining runs of salmon at harvestable levels. To achieve this goal, there needs to be a big-picture approach to restoring watersheds and the landscape processes that create and maintain habitat.

A more immediate goal is for WRIA 1 runs to recover enough to contribute to "delisting"—recovering threatened stocks to the point where they can be taken off the federal endangered species list.

For WRIA 1 early chinook, the delisting goal is broken down into "planning targets"—goals for population numbers, growth rates, and other traits. If the population growth rate is 3.1 (that is, for every adult spawner, 3.1 descendants return to spawn), then the target for North Fork early chinook is 3,400 spawners, and the target for South Fork early chinook is 2,300.

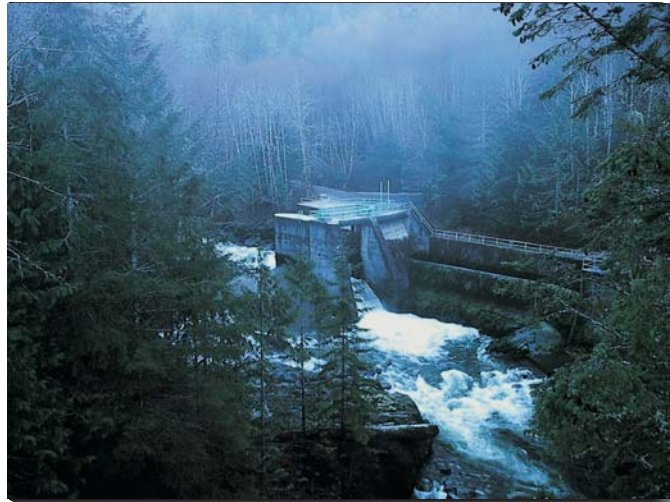
It may take 100 years or more to achieve the planning targets.

Eight key actions for early chinook

The factors that led to the decline of early chinook runs occurred over the past 150 years, and resolving them will take decades. However, there are eight key actions that can be taken within the next ten years that will either provide immediate benefits for early chinook or will lay the essential foundation for longer-term habitat recovery.

Action #1: Restore passage at critical barriers

Obstructions such as culverts, dams, tidegates, and floodgates block access to upstream habitats for both



RESTORE PASSAGE: *The Middle Fork Diversion Dam diverts water to a pipeline that augments Lake Whatcom.*

returning adults and juveniles. In WRIA 1, there are two major barriers that are limiting early chinook populations.

Middle Fork Diversion Dam

At river mile 7.2 of the Middle Fork Nooksack, a dam diverts water to Lake Whatcom to augment the City of Bellingham's drinking water supply. The dam blocks anadromous fish from ten miles of the Middle Fork and several miles of its tributaries—29% of the historical habitat for North Fork early chinook.

This Action would restore passage (either through replacing the dam with a different withdrawal system or building a fish ladder), release young chinook in the upper Middle Fork, and determine how many fish are using the newly accessible habitat through annual surveys. These activities are expected to cost between \$3,750,000 and \$7,350,000. In addition, since the Lake Whatcom state kokanee hatchery will lose its pathogen-free status, hatcheries on other lakes will need to be developed, at a cost of approximately \$5,000,000.

Canyon Creek

Due to both floods and human modifications, fish are

unable to reach 4.1 miles of quality habitat. Interim fixes will be implemented in 2005, with a permanent passage option no later than 2007. The interim and permanent measures are expected to cost between \$295,000 and \$420,000. The long-term goal is a habitat restoration plan for the lower mile of the creek that reduces or eliminates the need for flood protection; the restoration work is expected to cost between \$185,000 and \$1,600,000.

Action #2: Restore habitat in the forks, mainstem, and major early chinook tributaries

When functioning properly, high quality salmon habitat is self-sustaining. Natural processes create and maintain fish habitat, soften the impact of floods and enhance water quality.

However, little of the habitat in WRIA 1 can be considered properly functioning, with the exception of some federal lands. Human activities such as forestry, agriculture, development, and flood control have altered much of early chinook's historical habitat.

A computer model called Ecosystem Diagnosis and Treatment (EDT) was used to analyze how habitat is affecting early chinook runs. The model predicts that four types of projects will be the most useful in recovering threatened runs: (1) large wood jams that stabilize channels, increase habitat complexity, and reconnect rivers to floodplains, (2) riparian (streamside) plantings to increase shading, bank stability, and wood inputs to streams, (3) levee removals/setbacks to increase flood storage and channel/floodplain connectivity, and (4) acquisition

RESTORE UPLANDS: *Each year, 70,000 cubic yards of sediment from this 100-foot-high landslide clogged spawning gravels in the upper South Fork near Larson's Bridge. An artificial logjam now prevents further undercutting of the slide.*



of land at risk of development or with high restoration potential.

This Action proposes a range of restoration strategies and projects that fall into these categories. These potential projects have not been agreed to by all affected parties, and inclusion in the list does not imply landowner consent for specific projects. Technical assessments that collect reach-level data on conditions and problems are estimated to cost \$500,000; plans that identify and prioritize specific projects are estimated at \$1,400,000; land acquisition is estimated at \$2,000,000 per year; and project implementation is estimated at \$59,700,000 to \$64,200,000.

Action #3: Integrate salmon recovery needs with floodplain management

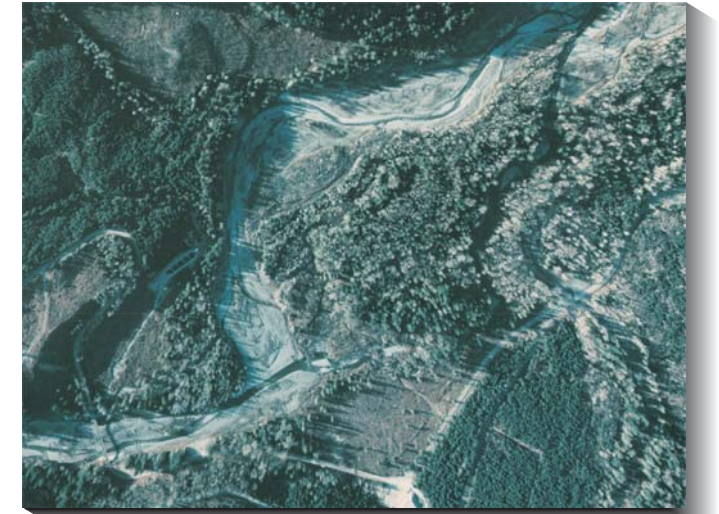
Traditional flood control methods typically have not considered either ecological impacts or the impacts on upstream or downstream properties. However, a strategic approach to floodplain management can benefit both people and fish.

Integrating habitat restoration with flood management will take three steps. The first is to create a technical committee that will share information about planned projects to manage floods and restore habitat, and to align flood projects with restoration goals as much as possible. The second step is to develop a list of priority projects that modify flood control infrastructure to better meet fish needs. The third step is to implement the projects. Cost estimates have yet to be determined.

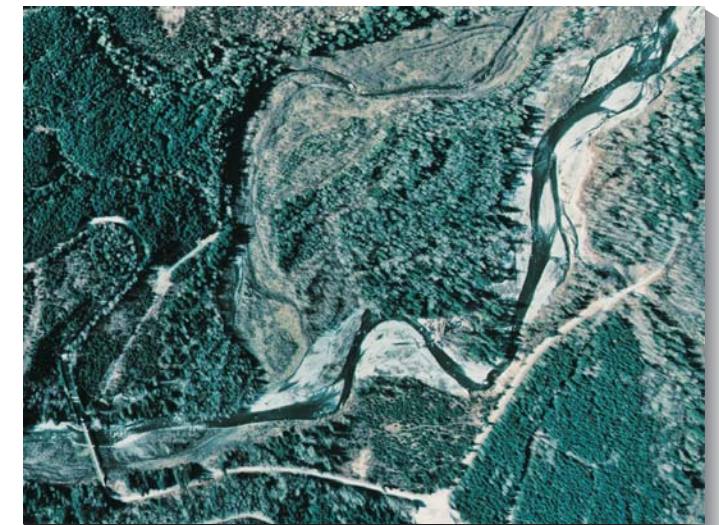
Action #4: Integrate habitat protection with local land use regulations

Two local regulations, the Critical Areas Ordinance (CAO) and the Shoreline Management Program (SMP), are pivotal in guiding the interaction of human development and fish habitat. These regulations are administered by Whatcom County and the cities and control how the land in or near streams, wetlands, and shorelines can be used and developed. Whatcom County must update both regulations by the end of 2005. With the county's population expected to increase by nearly 50% over the next 20 years, these updated regulations will play a crucial role in how future development and land use will harm or enhance salmon recovery.

The CAO update, which is farther along, includes several proposed changes that apply to salmon recovery. Larger buffers—up to 300 feet—would be prescribed for high quality (category I) wetlands, and larger buffers would be defined for streams subject to shorelines jurisdiction. New permanent structures would be prohibited within the channel migration zones, once they are formally designated. Property owners would have greater flexibility with a new



INTEGRATE RECOVERY AND FLOOD MANAGEMENT: *A river may avulse (abruptly change channels) during a storm. In 1994 (above), the Middle Fork avulsed out of the channel at the top of the photo. Ten years later (below), the river has developed some complexity in its new bed, while the old bed has become vegetated.*



process allowing them to compensate for critical areas impacts by using mitigation banks.

Action #5: Establish new instream flows for WRIA 1

In 1986, the state Department of Ecology set instream flows (a minimum flow level for a given stream at a given time of the year) for WRIA 1. These flows are meant to benefit instream uses, such as fish. In light of new data since then, instream flow levels will be revisited over the next several years through the WRIA 1 Watershed Management Project, with the goal of proposing new levels for all streams for Ecology to consider. Any new flow regimes will affect how much water is available for current and future instream and out-of-stream uses, as well as water quality and available fish habitat.